

## THE SIMULIIDAE OF ALASKA

(DIPTERA)

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The intensive study of the biology of the Alaskan biting Diptera, undertaken in 1947 and 1948 by the Alaskan Insect Project,<sup>1</sup> has resulted in 36 species of black flies being known from that Territory, more than from any state of the United States or any Province of Canada. I had hoped to incorporate the descriptions of the five new species and of formerly unknown pupae or sexes in a complete revision of the Nearctic Simuliidae. Completion of that task is not foreseeable in the immediate future, so in order to make names available for six species I am presenting this preliminary paper. A more complete treatment of all the species here included, with further illustrations and descriptions, will have to await the complete revision. The bibliographic citations given are only those of the original proposal of the valid or newly synonymized names and of the best available descriptions. I have described in detail only that which is new. For the parts of the male terminalia I have adopted the terms used by Freeman 1950 (*Ann. Trop. Med. & Parasit.* 44(2): 146-152), the adminiculum of authors becoming the ventral plate, and the adminicular arms the parameres.

I have given only the Alaskan distribution for all but the new species, leaving the entire distribution of the described species for the later paper. Since a paper is being prepared on the biology of the Alaskan black flies, I here omit seasonal distribution or other biological information. In the distributional data the numbers following the Alaskan roads indicate the distance on the road from its beginning, as shown on the accompanying map prepared by Kathryn M. Sommerman.

I am particularly indebted to Dr. R. I. Sailer and Dr. Kathryn M. Sommerman, and their assistants, who greatly extended the work in 1948 that I began in 1947.

## KEYS TO ALASKAN GENERA, ADULTS

1. A bulla behind eye laterally; scutum with stout erect hairs but no fine recumbent hairs..... *Gymnopsis* Stone
- No bulla behind eye; scutum usually with fine recumbent hairs but never with stout, erect ones..... 2

<sup>1</sup>This project was conducted under a transfer of funds from the Department of the Army to the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.



ALCAN HIGHWAY - CANADIAN BORDER MILE-POST 1220 TO DELTA JUNCTION  
MILE-POST 1430, 210 MILES

CHITINA ROAD - RICHARDSON HIGHWAY TO CHITINA, 40 MILES

CIRCLE HOT SPRINGS ROAD - STEESE HIGHWAY TO CIRCLE HOT SPRINGS, 10 MILES

ELLIOTT HIGHWAY - FOX TO LIVENGOOD, 77 MILES

GLENN HIGHWAY - ANCHORAGE TO GLENALLEN JUNCTION, 169 MILES

NABESNA ROAD - BIG TIMBER LODGE TO NABESNA, 110 MILES

NORTHWAY ROAD - ALCAN HIGHWAY TO NORTHWAY, 9 MILES

RICHARDSON HIGHWAY - VALDEZ TO FAIRBANKS, 356 MILES

SLANA-TOK ROAD - SLANA TO TOK, 75 MILES

STEESE HIGHWAY - FAIRBANKS TO CIRCLE, 170 MILES

WILLOW ROAD - PALMER TO WILLOW, 60 MILES

MAP OF ALASKA, SHOWING THE HIGHWAYS

2. Second hind tarsal segment with pedisulcus; vein R with or without setae above ..... *Simulium* Latreille  
 Second hind tarsal segment without pedisulcus; vein R with setae on dorsal surface ..... 3
3. Microtrichia of anterior wing veins hair-like, not intermingled with spiniform ones; radial sector forked ... *Prosimulium* Roubaud  
 Microtrichia of anterior wing veins mixed, hairlike and spiniform; radial sector rarely forked ..... *Cnephia* Enderlein

PUPAE

1. Dorsum of abdomen with no hooks; sternites 4-6 each with about 10 hooks in more than one transverse row; almost no cocoon ..... *Gymnopsis* Stone  
 Dorsum of abdomen with hooks on some of the segments; if sternites 4-6 have more than 4 hooks these are in a single transverse row ..... 2
2. Strong terminal hooks present; cocoon irregular without any clearly defined anterior margin; respiratory filaments if fewer than 14 not arising from more than two main trunks; if more than 14 not arising from a rounded knob on a short petiole ..... *Prosimulium* Roubaud  
 Terminal hooks usually very weak or absent and cocoon well formed and with a clearly defined anterior margin; if not, the respiratory organ of about 11 filaments arising at a considerable distance from the base from two main trunks, or the filaments more numerous, arising from a rounded knob on a short petiole ..... 3
3. Either terminal hooks well developed and cocoon poorly formed or cocoon with a broad antero-ventral collar so that it is boot-shaped and tergites 5-7 each have an anterior row of small spines ..... *Cnephia* Enderlein  
 Terminal hooks weak or absent; cocoon well developed; either cocoon is boot-shaped with a series of loops forming the anterior margin and tergites 5-7 are free of spines anteriorly, or the cocoon is wall-pocket shaped ..... *Simulium* Latreille

Genus **Gymnopsis** Stone

FEMALES

- Width of eighth tergite greater than width of head ..... *dichopticus* Stone  
 Width of eighth tergite about half inch width of head ..... *holopticus* Stone

MALES

- Dichoptic; genitalia broader than head ..... *dichopticus* Stone  
 Holoptic; width of genitalia about half width of head ..... *holopticus* Stone

## PUPAE

- No terminal hooks; respiratory filaments usually 4, the dorsal pair usually short..... *dichopticus* Stone  
 Well developed terminal hooks present; respiratory filaments usually 2 or occasionally with a third short one.....  
 ..... *holopticus* Stone

**Gymnopsis dichopticus** Stone

Proc. Ent. Soc. Washington, 51:261, 1949, ♀, ♂, pupa.

Alaskan Distribution.—Elliott Highway, 27-68; Glenn Highway, 117-138; Nabesna Road 50-96; Willow Road, 41; Richardson Highway, 73-112; Steese Highway 19-121; Slana Tok Road, 8-83; Whittier.

**Gymnopsis holopticus** Stone

Proc. Ent. Soc. Washington, 51:265, 1949, ♀, ♂, pupa.

Alaskan Distribution.—Near Circle Hot Springs; Elliott Highway, 42-68; Glenn Highway, 137; Nabesna Road, 50-84; Richardson Highway, 193; Slana-Tok Road, 11-15; Steese Highway, 15-121.

Genus **Prosimulium** Roubaud

## FEMALES

1. Claws bifid; that is, with the basal swelling produced into a strong acute tooth ..... 2  
 Claws simple, with no more than a basal swelling or with a very minute basal tooth adjacent to the basal swelling ..... 5
2. Mesoscutum predominately reddish brown; rather large species, the wing 4.5-5.0 mm long ..... *onychodactylum* D. & S.  
 Mesoscutum dark brown; smaller species, the wing less than 4.0 mm long ..... 3
3. A few fine sternopleural hairs ..... *pleurale* Mall.  
 No sternopleural hairs ..... 4
4. Antenna with 11 segments; mandibles and maxillae not toothed or serrate ..... *alpestre* D. R. & V.  
 Antenna 9 or 10 segmented; mandibles serrate; maxillae with retrorse teeth ..... *decemarticulatum* (Twinn)
5. Integument orange ..... *fulvum* (Coq.)  
 Integument dark brown to black ..... 6
6. Sclerotized sternal plates on segments 2-6 ..... *ursinum* Edw.  
 Sternites 2-6 membranous ..... 7
7. Stem vein with dark hairs ..... *dicum* D. & S.  
 Stem vein with pale yellow hairs ..... *hirtipes* (Fries), *travisi*, n. sp.

## MALES

1. Antenna with 11 segments ..... 2  
 Antenna with less than 11 segments ..... *decemarticulatum* (Twinn)
2. Hind femora, at least, yellow ..... 3  
 Hind femora brown or blackish ..... 5

- |    |   |   |   |
|----|---|---|---|
| 3. | Integument of thorax orange .....   | <i>fulvum</i> (Coq.)                          |   |
|    | Integument of thorax dark brown to blackish.....  |   | 4 |
| 4. | Dististyles with 4 or 5 teeth .....   | <i>alpestre</i> D. R. & V.                    |   |
|    | Dististyles with 2 teeth.....   |   |   |
|    | ..... <i>onychodactylum</i> D. & S. <i>travisi</i> , n. sp., <i>ursinum</i> Edw.              |   |   |
| 5. | Ventral plate apically with sharp lateral prongs between which<br>lies a two-tined fork ..... | <i>pleurale</i> Mall.                         |   |
|    | Ventral plate not so formed .....   | <i>dicum</i> D. & S., <i>hirtipes</i> (Fries) |   |

PUPAE

- |    |   |   |   |
|----|---|---|---|
| 1. | Respiratory organ consisting of two stout, divergent tubes on a<br>short petiole, from which arise slender filaments (Fig. 1) ..... | <i>onychodactylum</i> D. & S.                 |   |
|    | Respiratory organ not so formed .....   |   | 2 |
| 2. | Respiratory filaments 9, arranged in a whorl from a short base<br>.....   | <i>decemarticulatum</i> (Twinn)               |   |
|    | Respiratory filaments 14 or more .....  |   | 3 |
| 3. | Respiratory filaments 14 or 15.....   | <i>ursinum</i> Edw.                           |   |
|    | Respiratory filaments 16 or more .....  |   | 4 |
| 4. | Respiratory filaments 16, closely clumped; dorsum of thorax<br>rugose .....   | <i>travisi</i> , n. sp.                       |   |
|    | Respiratory filaments 16 or more; if only 16 the main trunks<br>more divergent and thorax not rugose .....                          |   | 5 |
| 5. | Respiratory filaments 16 .....  | <i>fulvum</i> (Coq.), <i>hirtipes</i> (Fries) |   |
|    | Respiratory filaments more than 16.....   |   | 6 |
| 6. | Respiratory filaments 21 .....  | <i>dicum</i> D. & S.                          |   |
|    | Respiratory filaments more than 21 .....  |   |   |
|    | ..... <i>alpestre</i> D. R. & V., <i>pleurale</i> Mall.   |   |   |

**Prosimulium alpestre** Dorogostajskij, Rubzov, and Vlasenko

Leningrad Acad. Sci., URSS, Inst. Zool., Mag. Parasitol. 5:136, 1935,  
♀, ♂, pupa.

Alaskan Distribution.—Anchorage; Chitina Road, 4-10; Eklutna Lake;  
Elliott Highway, 9-245; Slana-Tok Road, 4-46; Steese Highway, 16-99;  
Valdez.

This species, described from East Siberia, is here reported  
from the North American continent for the first time. It is  
one of the most abundant species in many streams in the  
Alaska Range of central Alaska. Adults are rarely encoun-  
tered, probably because they are not bloodsucking.

**Prosimulium decemarticulatum** (Twinn)

Canad. Jour. Res. D, 14:110, 1936 (*Simulium* (*P.*)), ♀, ♂, pupa.

Alaskan Distribution.—College.

A male and female were collected in an emergence trap in  
the outlet stream of a pond near College. The male has only  
9 antennal segments, but the terminal segment is slightly

constricted giving the appearance of two fused segments, and the genitalia agree well with Twinn's figure and description.

**Prosimulium dicum** Dyar and Shannon

Proc. U. S. Nat. Mus. 69(10):17, 1927. ♀.

Alaskan Distribution.—Ketchikan (nine of type series).

**Prosimulium fulvum** (Coquillett)

Proc. U. S. Nat. Mus. 25:96, 1902 (*Simulium*), ♀, ♂; Dyar and Shannon, Proc. U. S. Nat. Mus. 69(10); 7, ♀, ♂.

Pupa.—I have found no means of distinguishing the pupa of *fulvum* from that of *hirtipes*. Although the adult females of this species are frequently encountered very few pupae have been collected and only 6 adults, all females, have been reared.

Alaskan Distribution.—Anchorage; Camp 327, Alaskan Engineering Commission; Cape Fanshaw; Chitina Road 4; Eklutna Lake; Fourth of July Creek; Glenn Highway, 16-36; Golovin; Homer; Juneau; Katmai; Kukak Bay; Nabesna Road 80; Naknek Lake; Richardson Highway, 15-188; Seward; Sitka; Skagway; Steese Highway, 59-118; Valdez; Virgins Bay, Prince William Sound; Willow Road 29-36.

**Prosimulium hirtipes** (Fries)

Monog. Simul. Sueciae, observationes entomologicae 1:17, 1824 (*Simulia*), ♀, ♂; Puri, Parasitology 17:359-362, 1925 (*Simulium*), larva, pupa; Twinn, Canad. Jour. Res. D, 14:103, 1936 (*Simulium* (P.)), ♀, ♂, pupa.

Alaskan Distribution.—Anchorage; Camp 327, Alaskan Engineering Commission; Cape Fanshaw; Chitina Road, 3-13; Douglas Island; Eklutna; Elliott Highway, 25-43; Glenn Highway, 16-65; Goose Bay, Knik Arm; Hurricane; Katmai; Ketchikan; Kodiak; Kukak Bay; Lagoon; Matanuska; Mount McKinley; Nabesna Road, 52-96; Naknek Lake; Pigot Bay, Prince William Sound; Popoff Island; Richardson Highway, 8-298; Seward; Slana-Tok Road, 10-38; Steese Highway 6-97; Valdez; Virgins Bay, Prince William Sound; Whittier; Willow Road, 2-33.

**Prosimulium onychodactylum** Dyar & Shannon

Fig. 1

Proc. U. S. Nat. Mus. 69(10):14, 1927, ♀; Hearle, Proc. Ent. Soc. British Columbia 29:18, 1932 (unnamed), pupa.

Male.—Considerably darker than female, the orange of the sentum scarcely evident. Head holoptic, the facets above antennae much larger than those below; clypeus dark, with erect, dark brown hair. Stem vein with yellowish brown hair; legs slightly darker than in female. Leg ratios: I. 8:4:15:16:9:5:3:1.8:1.5; II. 6:4:18:16:7:4.2:2.6:1.5:2; III. 8.5:4:24:21:14:6:3:1.5:1.5. Hind basitarsus 4 times as long as greatest width; second hind tarsus slightly less than three times as long as

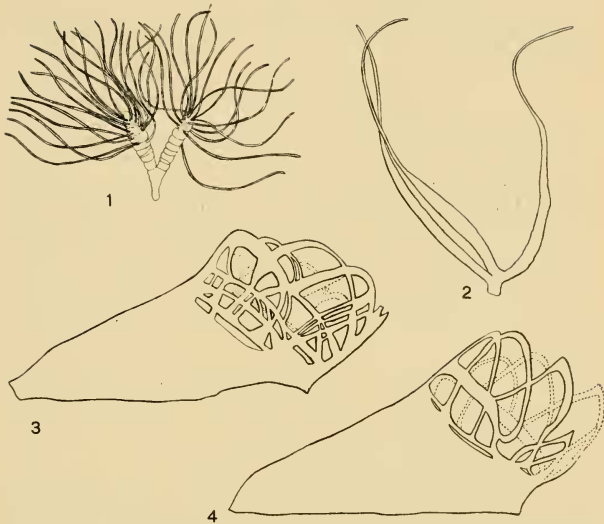


Fig. 1, *Prosimulium onychodactylum* D. & K., pupal respiratory organ. Fig. 2, *Simulium (Eusimulium) baffinense* Twinn, pupal respiratory organ. Fig. 3, *Simulium (S.) arcticum* Mall., cocoon. Fig. 4, *Simulium (S.) corbis* Twinn, cocoon.

greatest width. Tergites and sternites dark brown, the latter well developed on segments 3-8; basistyle short, stout; dististyle rather short, tapering, the apex with two teeth; ventral plate broad, scarcely notched apically.

Pupa.—Length 4.5 to 5.0 mm. Respiratory organ (fig. 1) consisting of two stout, shallowly-ringed clubs arising from a small, slender base, the dorsal club slightly the smaller, with about 16 slender filaments arising from the apical third, the ventral with more than 20 filaments arising from the apical half. Thorax slight rugose anteriorly; no trichomes. Abdomen dorsally with an anterior transverse band of very fine teeth on segments 3-9 and eight heavier hooks posteriorly on segments 3 and 4; ventrally segment 5 with two stout teeth near the posterior margin and segments 6 and 7 with four each, the median ones in line with those on 5, the lateral ones clear to the side. Terminal hooks of abdomen large, arising close together and diverging. Cocoon poorly developed, consisting of strong threads to which sand grains, often of considerable size, adhere.

Alaskan Distribution.—Anchorage; Glenn Highway, 17-36; Ketchikan; Nabesna Road 64-70; Richardson Highway, 14-38; Steese Highway, 42; Willow Road, 32.

***Prosimulium pleurale* Malloch**

U. S. Dept., Agr., Bur. Ent. Tech. Ser. No. 26:17, 1914, ♀.

Synonym.—*Prosimulium pancerastes* Dyar & Shannon, Proc. U. S. Nat. Mus. 69(10):10, 1927, ♂ (new synonymy).

Pupa.—Length 3-3.5 mm. Respiratory organ of about 26 slender filaments, forming a broad clump about 0.4 length of pupa. Dorsum of thorax smooth or very faintly rugose; trichomes slender. Abdomen dorsally with an anterior transverse band of fine teeth on segments 4-9 and 8 large hooks posteriorly on segments 3-4; ventrally segments 4-7 with 4 hooks posteriorly; terminal hooks large, close together at base, divergent. Cocoon irregular, often covering entire pupa including the respiratory organ.

Alaskan Distribution.—Anchorage; Camp 334, Alaskan Engineering Commission; Chitina Road, 4-10; Glenn Highway, 36; Healy; Hurricane; McKinley Park Station; Matanuska; Nabesna Road, 91-98; Nenana; Willow Road, 32; Paxson; Richardson Highway, 58-188; Slana-Tok Road, 64; Steese Highway, 40-93; Valdez.

The cotypes of *Prosimulium pancerastes* consist of two males in the U. S. National Museum from Peck, Idaho, one mounted whole on a slide, the other with abdomen and hind legs on a slide, the rest on a pin. This latter specimen is here designated as lectotype of the species. This specimen shows sternopleural hairs characteristic of *pleurale*, while all the males reared in Alaska show the characteristic genitalia of *pancerastes*. The other specimens mentioned by Dyar and Shannon under *pancerastes*, are, for the most part, other species of *Prosimulium*.

***Prosimulium travisi*, new species**

Female.—(Reared and possibly not fully darkened). Length 3 mm. Head orange-brown, densely clothed with yellow hair; width to height of head capsule as 4:3; width of head to width of thorax as 4.1:5.9. Antennae 11-segmented, the scape and pedicel orange-brown; the flagellum slightly darker; pedicel about equal in length to first flagellar segment; clypeus slightly longer than wide; palpi darker brown; width of frons at narrowest equal to combined lengths of scape and pedicel, strongly divergent above; mandibles and maxillae toothed. Scutum somewhat darker than head, densely clothed with yellow hair; extreme sides and most of pleura ashy gray; scutellum with dense, erect yellow hair; postnotum reddish brown; no hairs on pleural membrane or sternopleuron; mesepimeral tuft pale yellow. Wing 4 mm long, the veins yellow; hairs of stem vein bright yellow; halteres pale yellowish. Legs yellowish brown with yellow hair, the tarsi somewhat darkened; Leg



ratios: I. 6:3:13:13:9:4:3:1.5:3. II. ? :2:15:14:8:3.5:2:1.5:2. III. ? :? :18:18:12:4:2:1.5:2; claws untoothed. Abdomen yellowish brown, the hairs pale yellow; sternites 2-6 undeveloped; anterior gonapophyses and paraprocts short, the latter not projecting posteriorly and not approaching apex of the rounded cerci.

Male.—Length 3 mm. General color somewhat darker than ♀; hair coloration as in female. Leg ratios: I. 6:3.5:12:13:7.5:4.5:3.5:1.5:2; II. ? :4:13:13:6:3.5:2.3:1.5:1.5; III. 6:4:18:17:11:5:2:1.5:2; greatest width of hind basitarsus 0.3 length; second hind tarsus 2.5 as long as greatest width. Abdominal sternites sclerotized, clothed with pale hair. Ventral plate transverse, truncate apically, with the usual ventral, triangular lip; dististyle conical, with two distal teeth.

Pupa.—Length without respiratory organ 5 mm. Respiratory organ a narrow clump of 16 filaments arising from three main trunks, the whole about as long as pupal body to apex of wing pads; dorsum of thorax strongly, irregularly rugose; dorsal trichomes 6, rather stout, curving forward, arranged in a transverse ellipse. Abdominal segments 3-4 with 8 stout hooks on posterior margin of each; tergites 5 or 6-8 with anterior row of many fine spines; terminal hooks well developed, rather far apart basally; segments 5-7 ventrally with 4 retrorse hooks each on posterior margin; segment 4 with 2 hooks ventrally. Cocoon rather loosely woven but somewhat more regular than usual for genus, wall-pocket shaped, usually covering the abdomen only.

Holotype: Female, reared, Anchorage, Alaska, Sept. 30, 1948 (Sommerman & Dover). Paratypes.—ALASKA: Same data as type, ♂; Horsetail Falls, near Valdez, July 19, 1947 (Travis & Wilson), pupa; Richardson Highway, 17, Aug. 19, 1947 (Travis & Wilson), 26 pupae; 26, Aug. 13, 1947 (Storm), 4 pupae; Whittier, Aug. 5, 1947 (Travis), 5 pupae; Willow Road, 28.4, Aug. 1, 1948, pupa; Valdez, July 18, 1947 (Travis & Wilson), 2 pupae. (U. S. Nat. Mus. No. 61188). COLORADO: Loveland Pass, July 23, 1938 (H. H. & J. A. Ross), pupa (Ill. Nat. Hist. Surv.).

I take pleasure in naming the species after my friend B. V. Travis, leader of the Alaskan Insect Project of 1947 and 1948, and the first collector of this species in Alaska.

#### *Prosimulium ursinum* (Edwards)

Ann. & Mag. Nat. Hist. (10)15:535, 1935, (*Simulium* (P.)), ♀, larva, pupa.

Synonym.—*Simulium* (*Prosimulium*) *browni* Twinn, Canad. Jour. Res. D. 14:113, 1936, ♀, pupa (new synonymy).

Male.—Length 4.5 mm. Head dark, the clypeus with dark hair; antenna brown, slender, the pedicel about as broad as long, the first flagellar segment slightly more slender; third palpal segment dark, the sensory organ small, about 0.25 length of segment; 4th and 5th palpal segments paler, the 5th twice as long as 4th. Thorax nearly

black, the hairs yellowish-brown, the more erect ones somewhat darker. Wing 4 mm long; veins yellowish. Coxae dark brown, with dark hair; rest of legs yellowish brown, somewhat darkened at femoro-tibial joint; Leg ratios I. 6.5:4:13:16:8.5:5:3:1.5:1.5; II. 6:5:15:16:7:4:2.5:1.5; 1.5; III. 8:4:22:19:12:5:2.5:1.5:2; first and second hind tarsal segments swollen, the ratio of length to greatest width being 3 and 2 respectively. Sclerotized portions of abdomen dark brown, the sternites developed; genitalia half as wide as head; basistyles reddish brown, stout; dististyle broad at base, tapering apically and slightly curved, with two teeth, one at apex, the other subapical on the convex margin; ventral plate about as broad as long, the basal prongs compressed, the median portion stout, scarcely emarginate apically, the median lip thick, blunt, and curved backward only slightly.

Alaskan Distribution.—Alean Highway, 1363-1380; Glenn Highway, 117-135; Nabesna Road, 50-84; Richardson Highway, 26; Slana-Tok Road, 15; Steese Highway, 16-139.

I have seen topotypic larvae and pupae of *ursinum* and have compared the pupae with the original pupae of *browni* and find no differences. Twinn pointed out to me the possible synonymy of these species and I think it is quite correct. Twinn described the female of *browni* as having no tooth on the claw, but the holotype and paratypes do have a small but distinct one.

#### Genus *Cnephia* Enderlein

Of the six species that I have assigned to this genus in Alaska, four are undescribed. Two of these, *saileri* and *sommermanae*, are closely related to *Prosimulium borealis* Malloch, 1919, but this species was described from a male, and without the females or pupae it will be very difficult to fix the identity of Malloch's species. There appear to be one or more northern species scarcely distinguishable from *borealis*, so Malloch's species must remain a *species dubium* for the present. The pupae of the Alaskan *Cnephia* show a great deal of divergence in structure, which throws some doubt upon the generic position of some of the species, but until adult characters can be found to support the pupal divergence, I prefer to place them all in *Cnephia*.

#### FEMALES

- |   |                          |
|---|--------------------------|
| 1. Tarsal claws simple .....  | 2                        |
| Tarsal claws each with a strong basal projection .....  | 3                        |
| 2. Maxillae with retrorse teeth; mandibles serrate; calcipala large and broadly rounded ..... | <i>mutata</i> (Mall.)    |
| Maxillae without teeth; mandibles not serrate; calcipala shorter and somewhat pointed .....   | <i>emergens</i> , n. sp. |

3. Mesopleural membrane with a distinct patch of fine hairs ..... 4  
 Mesopleural membrane bare ..... 5
4. Maxillae with retrorse teeth; mandibles serrate; tooth of tarsal  
 claw stout, the sides convex in profile.....*saileri*, n. sp.  
 Maxillae without retrorse teeth; mandibles not serrate; tooth of  
 tarsal claw slender, the sides straight in profile.....  
 .....*sommermanae*, n. sp.
5. Usually smaller species, the wing less than 3 mm long; basal  
 projection of tarsal claw somewhat more than half length of  
 claw, the cleft very narrow; maxillae with retrorse teeth;  
 mandibles serrate.....*minus* (D. & S.)  
 Usually larger species, the wing more than 3 mm long; basal  
 projection of tarsal claw about half length of claw, the cleft  
 not so narrow; maxillae without retrorse teeth; mandibles not  
 serrate .....*eremites* Shewell

MALES

1. Dististyle with two rather blunt terminal teeth ..... 2  
 Dististyle with one apical tooth..... 3
2. Galea greatly reduced, much shorter than labrum-epipharynx ...  
 .....*emergens*, n. sp.  
 Galea of normal size, nearly as long as labrum-epipharynx.....  
 .....*mutata* (Mall.)
3. Mesopleural membrane bare ..... 4  
 Mesopleural membrane with a distinct patch of fine hair.....  
 .....*saileri*, n. sp., *sommermanae*, n. sp.
4. Usually smaller species, the wing less than 3 mm long; hind  
 basitarsus parallel-sided, more than 4 times as long as wide;  
 ventral plate rather broad with a median lip but not with a  
 thick, compressed median lobe .....*minus* (D. & S.)  
 Usually larger species, the wing more than 4 mm long; hind  
 basitarsus somewhat narrowed basally, less than 4 times as  
 long as wide; ventral plate with a thickened, compressed  
 median lobe .....*eremites* Shewell

PUPAE

1. Terminal hooks absent; cocoon-boot-shaped, with a broad antero-  
 ventral connection ..... 2  
 Terminal hooks present; cocoon loose and poorly defined, with  
 no antero-ventral connection ..... 3
2. Respiratory organ extending antero-posteriorly, the filaments  
 spreading out laterally from this enlarged portion.....  
 .....*sommermanae*, n. sp.  
 Respiratory organ without a strong trunk extending anteriorly;  
 some of the central filaments extending medially.....*saileri*, n. sp.
3. Respiratory filaments about 11, arising irregularly from two main  
 trunks .....*mutata* (Mall.)

Respiratory filaments 25-28, arising from a rounded knob on a short petiole ..... *cremites* Shewell

The pupa of *minus* is not known to me, but according to Hearle (1932) it has 8 respiratory filaments. The pupa of *emergens* has not been discovered.

#### *Cnephia emergens*, new species

Female.—Length 2.0 to 2.5 mm. Head brown, with yellow, recumbent hair; width of frons at narrowest 0.94 mm, widened above; antenna yellow-brown, 11-segmented, about 0.5 mm long; segments 3-10 broader than long; palpus about 0.47 mm long; ratios of segments 3-5: 2:1.7:2.3; sensory organ of segment 3 small, about 0.2 length of segment; maxillae with a few fine hairs on margin but no retrorse teeth; mandibles not serrate. Scutum dark brown, clothed with yellow recumbent hair; humeri and scutellum yellow, the hairs of the scutellum yellowish brown, erect; postnotum yellowish; pleuron mostly yellow-brown; pleural membrane bare; mesepimeral tuft yellow. Wing 2.5 to 3.0 mm long; hairs on base of costa, stem vein, and vein R dark brown; subcosta with hairs beneath; halteres pale yellowish brown. Legs almost uniformly yellow-brown, with yellowish hairs; leg ratios: I. 4.5:2.2:7.3:8.5:2:1.6:1:1.5; II. 3.5:3:8.5:7:4.5:2:1.2:1:1.5; III. 5.5:3.5:12:11:8:2:1:1:1.5; hind basitarsus about 5.3 times as long as greatest width, the sides nearly parallel; calcipala well developed, but not as large as in *mutata*; second hind tarsal segment narrowed at base, but with no pedisuleus; claws simple. Abdomen yellow-brown with concolorous hair; tergites 2-4 well developed, those posteriorly scarcely sclerotized; sternites unsclerotized; anterior gonapophyses short, the inner apical angle not produced; paraprocts slightly longer than wide, the ventral margin concave; cerci much shorter than wide; stem of genital fork about 0.19 mm long; each arm abruptly widened to form a pale rectangular plate.

Male.—Holoptic, the large facets extending to level of bases of antennae; rest of head dark, with dark hairs; antenna rather dark brown, about 0.4 mm long; palpus about as in ♀, but sensory organ even smaller. Scutum deep brownish black, with dark yellow-brown hairs, the humeri and scutellum paler; pleuron brown; postnotum dark; mesepimeral tuft dark brown. Wing 2.0 mm long; halter with stem brown, knob paler; Legs rather uniformly brown; leg ratios: I. 4:2.5:6.5:7:5:2:1.3:1:1; II. 4:3:8:7:4:2:1.3:1:1; III. 4.5:2.5:10:9.5:7:1.6:1:1:1; hind tibia somewhat broadened, about 3.5 times as long as wide; calcipala short. Abdomen yellow-brown; tergites all sclerotized, the posterior ones weakly so; sternites weakly sclerotized; basistyle subquadrate; dististyle about twice as long as broad, nearly parallel-sided to near apex, with a single stout spine at apex inwardly; ventral plate slightly longer than broad, the sides parallel, the apex rounded, hairy, the basal arms short and stout.

Holotype: Female, emergence trap, Fairbanks, Alaska, June 19, 1948. Paratypes—same, June 19-24, 5 ♀ ♀, 1 ♂. (U. S. National Museum No. 61189).

This species resembles *mutata* in that the female has simple claws, but the absence of retrorse teeth on the maxillae and serrations on the mandibles of the female, and the greatly reduced galea of the male will readily separate it. The species is also somewhat smaller than *mutata* and the calcipala is not so large.

***Cnephia eremites* Shewell**

Canad. Ent. 84:36, 1952.

Alaskan Distribution.—Alean Highway, 1363; College; Elliott Highway, 46; Richardson Highway, 358.

***Cnephia minus* (Dyar & Shannon)**

Proc. U. S. Nat. Mus. 69(10):21, 1927 (*Eusimulium*) ♀; Hearle. Proc. Ent. Soc. Brit. Columbia 29:10, 1932 (*Eusimulium*) ♀, ♂, pupa.

Hearle described the male and pupa of this species, but the descriptions are rather brief and I do not feel certain that his determination was correct, since he mentions a pedisuleus, which is absent or extremely shallow in *minus*. Females and males were collected in considerable numbers in an emergence trap in Alaska, but none was reared from collected pupae, nor were any pupae found corresponding to Hearle's description. I describe males associated with females I consider *minus*.

Male.—Holoptic, the upper half of eyes with enlarged facets; rest of head blackish, with dark brown hair; antennae entirely dark brown, usually with 11 segments, but sometimes as low as 8 due to fusion of some of the segments; palpus paler, about 0.40 mm long; ratio of segments 3-5: 1.7:1.6:2.2; sensory organ small, about one-eighth length of segment; scutum velvety blackish brown with golden brown recumbent hair; scutellum paler, with erect dark hair; postnotum and pleuron dark brown; no hairs on mesopleural membrane; mesepimeral tuft dark brown. Wing 2.0-2.5 mm long; basal cell very small or undeveloped; hairs at base of costa and on stem vein dark; halteres yellowish brown, the knobs paler. Legs yellowish brown, darkened at femoro-tibial joint, and apex of hind tibia; hairs brownish; leg ratios: I. 3:2.5:7:6:5.5:2.3:1.2:0.8:0.8; II. 2.5:3:7:6:3.7:2:1:0.6:1; III. 4:2:9:9:6.5:2:1:1:1; hindtibia rather stout, tapering toward base; hind basitarsus with parallel sides about 4.2 times as long as wide; calcipala very short; no pedisuleus, but sometimes with a very shallow depression. Abdomen dark brown, the tergites broad, with brownish hair; sternites 3.6 sclerotized but small, with dark hair; basistyle stout, subquadrate; dististyle longer than basistyle, broad basally, tapering to a single tooth apically, curved but not abruptly so; ventral plate rather broad, with short basal arms and a slightly downcurved median lip.

Alaskan Distribution.—Outlet stream of lake at College.

***Cnephia mutata* (Malloch)**

U. S. Dept. Agr. Bur. Ent. Tech. Ser. 26:20, 1914 (*Prosimulium*), ♀;

Twinn, Canad. Jour. Res. D, 14:125, 1936 [*Simulium (Eusimulium)*],  
♀, ♂, pupa.

Synonym.—*Eusimulium mutatum permutatum* Dyar & Shannon, Proc.  
U. S. Nat. Mus. 69(10):17, 1927 ♀, (new synonymy).

Alaskan Distribution.—Camp 327, Alaskan Engineering Commission;  
Cape Fanshaw; College; Deer Mountain; Goose Bay, Knik Arm; Ket-  
chikan; Metlakahtla; Petersburg; Pigot Bay, Prince William Sound;  
Sitka; Thane; Virgins Bay, Prince William Sound; Wrangell; Yakutat.  
The only inland record is that from College, consisting of a pupa with  
fully developed female, and a pupal exuvium.

There seems to be no justification for considering western  
specimens as being racially distinct from those in the Eastern  
United States.

#### *Cnephia saileri*, new species

Female.—Length 3.0-3.5 mm. Head gray, with dense, pale yellow  
recumbent hair; width of front at narrowest 0.12 mm, somewhat widened  
above; antenna 11-segmented about 0.6 mm long, dark brownish black,  
including scape and pedicel; palpus 0.69-0.81 mm long; ratios of seg-  
ments 3-5: 2.7:3.2:6.5; third segment dark, somewhat swollen basally,  
the sensory organ large, nearly half length of segment; 4th and 5th  
segments pale; maxillae with retrorse teeth; mandibles serrate. Scutum  
gray on anterior margin except for narrow median portion, and gray  
on lateral and posterior declivities, disk brown with three narrow paler  
lines; most of scutum clothed with pale yellow recumbent hairs;  
scutellum reddish brown with long, erect, pale hair; postnotum darker;  
pleuron gray with reddish brown areas; pleural membrane with a dense  
patch of pale hair; mesepimeral tuft pale yellow. Wing 4.0-4.5 mm  
long; radial sector not forked; basal cell small but distinct; hairs at  
base of costa and on stem vein mixed pale yellow and dark; hairs on  
vein R dorsally abundant, dark; subcosta with hairs beneath. Halteres  
yellow; Legs to tarsi brown, clothed with pale yellow hair; tibiae some-  
what paler centrally; tarsi darker, with mostly dark hair; leg ratios:  
I. 5:4.5:11.5:13:9:4:3:1:2; II. 5:4:14:12:7:3:1.8:1:1.7; III. 6.5:4:17:  
17:12:3.6:2:1:1.6; hind basitarsus about 8 times as long as wide, nearly  
parallel sided; calcipala very short; no pedisculus; claw with basal tooth  
about half length of claw, the sides somewhat convex. Abdomen grayish  
brown, segments 7-8 grayer; dorsum of abdomen with abundant yellow  
hair; hairs of venter somewhat paler; tergites moderate in size; ster-  
nites not developed; stem of genital fork 0.19 mm long; each arm  
abruptly widened to form a pale, rectangular plate; anterior gonapo-  
physes short, rounded apically; paraprocts short, not produced ven-  
trally; cerci slightly higher than long.

Male.—Holoptic, the eyes very large, the upper two-thirds with en-  
larged facets; rest of head black with dark brown hairs; antennae en-  
tirely dark; palpus dark, about 0.68 mm long; ratios of segments 3-5:  
2.6:2.2:4; sensory organ small, about 0.2 length of segment. Scutum

velvety black with golden brown, recumbent hair; scutellum black with long, erect, black hair; postnotum black; pleuron mostly black, the hairs of the mesopleural membrane and upper mesepimeron varying from yellow to dark brown. Wing 3.5-4.0 mm long; hairs at base of costa and stem vein black, sometimes with an admixture of long yellow hairs. Halteres yellowish brown. Legs black, clothed with yellowish brown to dark brown hairs; leg ratios: I. 6:3.5:11:12.5:9:4.5:3:1.5:1.2; II. 5.5:3.5:13:11:6.5:3.5:2:1:1.5; III. 7:3:18:11.5:3.5:2:1.5:1.5; hind tibia fusiform, its greatest width about 0.23 length; hind basitarsus broad and flat, its width about 0.32 length; calcipala very short. Abdomen brownish black, the hairs mostly dark; well developed sternal sclerites on segments 3-7, with dark hair; basistyle stout, subquadrate; dististyle about same length, curved, compressed and tapering apically with a single tooth at apex; ventral plate broad, with short, slightly converging basal arms; central portion paler, coming to a median, ventrally turned, pointed lip.

Pupa.—Length 3.75-4.75 mm; respiratory organ of 35-45 slender filaments which branch irregularly to form a rounded mass 1.0-1.5 mm long; many of the filaments arise at or close to the base and there is no strong trunk running antero-posteriorly; dorsum of thorax smooth; trichomes very small and indistinct; abdominal segments 3 and 4 dorsally with 14-16 retrorse spines near posterior margin, arranged as 4 or 5 on each side near median line and 3 more laterad; similar spines but smaller on segment 2; segments 7 and 8 dorsally each with a row of 16-18 spines near anterior margin; segment 3 ventrally with 3 spines on each side; segment 4 with 5 on each side; segment 5 with 2 close together on each side; segments 6 and 7 each with 2 farther apart on each side; segment 8 with 2 small, on each side near lateral margin; terminal hooks absent. Cocoon 5-6 mm long, closely woven, having a broad anteroventral band at an angle to the surface; aperture distinctly dorsal and the respiratory organ of pupa scarcely extending above margin of cocoon.

Holotype: Female, outlet of Lower Fire Lake, Glenn Highway, 16, Alaska, May 29, 1948 (Alaska Ins. Proj.). Paratypes ALASKA: Alecan Highway, 1320-1396, ♀, 5 ♂♂, 2 pupae; Elliott Highway, 8.1, ♀; Glenn Highway, 16-148, 8 ♀♀, 14 ♂♂; Nabesna Road, 82-98 ♀, ♂, pupa; Richardson Highway, 27-298, 8 ♀♀, 6 ♂♂, 20 pupae; Steese Highway, 34-140, ♀, ♂, May 29-July 25. (All adults associated with pupal skins). ALBERTA: Maligne River, Jasper, July 27-31, 1932, 120 ♀♀, 47 ♂♂ (Hearle); MANITOBA: Churchill, June 29, 1948, ♂, 2 pupae. MONTANA: Two Medicine River, July 27, 1921, 3 ♀♀ (Dyar). NORTHWEST TERRITORY: Lake Harbor, Baffin Island, July 5, 1935, ♀ (Brown). YUKON TERRITORY: Watson Lake, June 18-23, 1948, 18 ♀♀, 6 ♂♂ (Mason & Hughes) Whitehorse, June 22, 1949, ♀ (Hoeking). (Holotype and paratypes, U. S. National Museum No. 61190; paratypes, Canadian National Collection).

I take great pleasure in dedicating this species to my friend, Dr. Reece I. Sailer, who has added so much to our knowledge of the Alaskan blackflies.

**Cnephia sommermanae**, new species

Female.—Length 2.75-4.0 mm. Head brownish gray to clear gray, with fine yellow to brown hair; width of front at narrowest 0.125-0.156 mm, slightly widened above; antenna 11-segmented, about 0.6 mm long, entirely dark brownish black; palpus 0.62-0.75 mm long; ratios of segments 3-5: 2.1:2:4; third segment dark, slightly swollen at basal third, the sensory organ very small, less than 0.15 length of segment; segments 4-5 paler; maxillae smooth, without teeth; mandibles without serrations, but with fine hairs distally. Scutum dark grayish, with pale yellow recumbent hair; a median and a pair of curved sublateral lines paler; scutellum reddish brown with long, erect, yellowish hair; postnotum darker; pleuron dark gray with reddish brown areas; pleural membrane with a patch of pale yellow hair on upper half; mesepimeral tuft pale yellow. Wing 3.0-3.8 mm long; radial sector not forked; basal cell small but distinct; hairs at base of costa and on stem vein mostly pale yellow; hairs on vein R dorsally abundant, pale yellow to brown; subcosta with hairs beneath. Halteres pale yellow; legs brown, the femora and tibiae, except at ends, and most of hind tarsal segments 1-2, somewhat paler; hairs of legs mostly pale; leg ratios: I. 6:3.7:11.5:13:8.5:4:2.5:1.5:2; II. 6:4:13:12.5:6.5:2.9:1.6:1.2:1.5; III. 7:4:18:16:10:3.5:2:1.5:2; hind basitarsus about 6 times as long as wide, with nearly parallel sides; no calcipala or pedisulcus; claw with an acute basal tooth slightly less than half length of claw, the sides in profile not convex. Abdomen grayish brown, clothed with rather sparse yellowish hair; tergites moderate in size; sternites not developed; stem of genital fork 0.19 mm long; each arm abruptly widened to form a somewhat rectangular plate, darkened on the antero-lateral margin and the apex; anterior gonapophyses very short and blunt, the inner margin parallel; paraprocts short, not produced ventrally; cerci about 1.5 times as high as long.

Male.—Holoptic, the eyes not so large as in *saileri*, the line between the large and small facets extending obliquely upward from just above the level of the antennae so that less than half the area is covered with the enlarged facets; rest of head black with mostly dark brown hair; antenna entirely dark; palpus dark, about 0.75 mm long; ratios of segments 3-5: 2.6:2.5:5; third segment dark, the sensory organ small as in ♀; segments 3-4 paler. Scutum black with long, pale yellow, recumbent hair; scutellum black with long, erect, pale yellow hair; postnotum black; pleuron mostly dark gray; a few pale yellow hairs on mesopleural membrane; mesepimeral tuft pale yellow; Wing 3.0-3.5 mm long; hairs at base of costa and on stem vein pale yellow to brown; subcosta with a row of fine hairs beneath Halteres pale yellow. Legs reddish brown to black, the femora, tibiae, and hind basitarsi palest;



hairs pale yellow; leg ratios: I. 6:3:11.5:12:8:4:2.5:1.5:1.5; II. 5:3:13:11:6:3:2:1:1.7; III. 6.5:3:17:15:9:3:1.7:1:2; hind tibia somewhat swollen, 4 times as long as greatest width; second hind tarsal segment thickened, about twice as long as wide. Abdomen black, with pale hair; sternites 3-8 well developed, the hairs long, pale; basistyle stout, subquadrate; dististyle about same length as basistyle, broad basally, tapering to a rather blunt apex bearing a single short spine; ventral plate broad, with short arms expanded distally, each with a short lateral projection; central portion paler, hairy, coming to a median, ventrally turned, pointed lip.

Pupa.—Length 3.5 mm. Respiratory organ of 50 to 60 filaments, or rarely as low as 25, these branching very irregularly and spreading outwardly from a stout, irregular trunk that extends antero-posteriorly and curves medially both before and behind, leaving a median dorsal oval above the thorax free of filaments; each mass of filaments is about 1.7 mm long and about half as wide medially; dorsum of thorax smooth; trichomes small and indistinct; abdominal segment 2 with an irregular row of about 16 small hooks extending clear across the segment; segments 3 and 4 each with a similar row of about 24 extending clear around, tergites 7 and 8 with a few small spines on each side near anterior margin; sternite 5 with 3 hooks on each side; sternites 6 and 7 each with 4 large hooks rather regularly spaced; no terminal hooks. Cocoon 5-6 mm long, rather closely woven, boot-shaped, the anterior aperture in which the respiratory organs of the pupa lie being obliquely dorsal in position, with a broad, oblique antero-ventral band beneath this aperture.

Holotype: Female, Steese Highway, 32, Sept. 3, 1948. Paratypes—Alcan Highway, 1380.1, Aug. 9, 1947, pupa (Storm); Glenn Highway, 91.5, July 25, 1948, 5♂♂, 96, Aug. 9, 1947, 3 pupae (Jenkins); Richardson Highway, 65.9, July 11, 1948, 2♂♂, 87, Aug. 13, 1948, 2 pupae, 187.5, July 17-24, 1948, 3♀♀, 1♂; 192.9, July 24, 1948, ♀, 220.2, July 23, 1948, ♀, 297.3, Sept. 1, 1948, ♀; Steese Highway, 16.2, Aug. 10, 1947, 3 pupae (Storm), Aug. 24, 1948, ♀, ♂, 40, Sept. 3, 1948, 3♀♀, 41.7, Aug. 10, 1947, 13 pupae (Storm), Sept. 3, 1948, ♂, 43.5, Sept. 3, 1948, 3♀♀, ♂; 53.4, Sept. 3, 1948, 2♀♀, 57.7, Sept. 3, 1948, ♂, 64.1, Sept. 3, 1948, 2♂♂, 89, Sept. 4, 1948, ♀, 120.3, Aug. 10, 1947, 2 pupae (Storm), Sept. 3, 1948, ♂; Willow Road, 32.3, July 31, 1948, ♂, 33, July 31, 1948, ♀, 2♂♂, 2 pupae. (U. S. National Museum No. 61191).

I take pleasure in naming this species after Kathryn M. Sommerman, who has done so much to make known the black-fly fauna of Alaska.

The close resemblance of the cocoon and the pupal respiratory organ to those of *pallipes* as figured by Rubzov (1940) led me to believe this to be that species, but further study shows this not to be the case. Rubzov describes *pallipes*

as having toothed mandibles and maxillae, and he shows the tooth of the tarsal claw to be decidedly stouter than in *sommermanae*. There are several species of the far north that could not be separated from the types of *pallipes* as described by Edwards (1924) so that the correct identity of *pallipes* may be very doubtful, but if we accept Rubzov's recognition of the species, I have not seen it from Alaska.

Genus *Simulium* Latreille

## FEMALES

1.	Vein R with hairs dorsally.....	2
	Vein R without hairs dorsally.....	6
2.	Claws with a strong basal projection.....	3
	Claws simple or with a very small subbasal tooth.....	5
3.	Postnotum with a patch of yellow, recumbent scales; scape and pedicel pale brown.....	<i>aureum</i> Fries
	Postnotum bare; antennae entirely dark.....	4
4.	Stem vein with dark pile which may appear coppery in reflected light... <i>gouldingi</i> , n. sp.; <i>latipes</i> Mg.; <i>pugetense</i> (D. & S.)	
	Stem vein with light yellow pile.....	<i>bicornis</i> , D. R. & V.
5.	Mandibles serrate; maxillae with strong retrorse teeth.....	
	.....	<i>fulcratum</i> Shewell
	Mandibles and maxillae with fine hair apically.....	<i>baffinense</i> Twinn
6.	Claws simple.....	7
	Claws with a basal projection or subbasal tooth.....	10
7.	Frons and terminal abdominal tergites shining black.....	8
	Frons and terminal abdominal tergites with at least a thin pollinosity.....	9
8.	Hairs on stem vein and base of costa pale.....	
	.....	<i>rubtzovi</i> Smart; <i>venustum</i> Say
	Hairs on stem vein and base of costa dark.....	<i>tuberosum</i> (Lund.)
9.	Abdomen with a very distinct black and light gray pattern.....	
	.....	<i>vittatum</i> Zett.
	Abdomen posteriorly blackish with a thin but distinct gray pollinosity.....	<i>decorum</i> Walk.
10.	Claws with a strong basal projection.....	11
	Claws with a small subbasal tooth.....	12
11.	Frons and terminal abdominal segments shining black.....	
	.....	<i>rugglesi</i> N. & M.
	Frons and terminal abdominal segments gray pollinose.....	
	.....	<i>meridionale</i> Riley
12.	Fore coxae dark; terminal abdominal segments with thin gray pollinosity.....	<i>nigricoxum</i> , n. n.
	Fore coxae yellow; terminal abdominal segments shining.....	13
13.	Mesoscutum with three narrow lines, the median one straight and slender, the laterals curved and somewhat wider.....	
	.....	<i>hunteri</i> Mall.

Mesoscutum not lined .....  
*arcticum* Mall.; *corbis* Twinn; *malyschevi* D. R. & V.

## MALES

1.	Vein R with hairs dorsally .....	2
	Vein R bare dorsally.....	5
2.	Postnotum with appressed yellow scales; ventral plate greatly compressed medially, the basal arms divergent .....	<i>aureum</i> Fries
	Postnotum without scales; ventral plate not greatly compressed .....	3
3.	Dististyle, when viewed from end, showing a flattened, shiny, triangular area, one corner of this forming an inner lobe .....	4
	Dististyle tapering to a point, not truncated in this manner.....	
	..... <i>baffinense</i> Twinn	
4.	Dististyle, viewed ventrally, more than twice as long as basal width .....	<i>bicornis</i> , D. R. & V.; <i>gouldingi</i> , n. sp.;
	..... <i>latipes</i> Mg.; <i>pugetense</i> D. & S.)	
	Dististyle, viewed ventrally, much less than twice as long as basal width .....	<i>farculatum</i> Shewell
5.	Dististyle short and stout with three or more teeth.....	<i>vittatum</i> Zett.
	Dististyle longer, with only one distal tooth, or none .....	6
6.	Dististyle with a stout spine or distinct tubercle at base in- ternally .....	7
	Dististyle without a stout spine or distinct tubercle at base .....	9
7.	Base of dististyle with a stout spine internally.....	<i>hunteri</i> Mall.
	Base of dististyle with a rounded tubercle internally.....	8
8.	Basal lobe of dististyle with a number of short stout spines .....	
	..... <i>tuberosum</i> (Lund.)	
	Basal lobe of dististyle with fine hairs only.....	<i>rugglesi</i> N. & M.
9.	Ventral plate more or less compressed, with denticles on margin .....	10
	Ventral plate broadly rounded without denticles on margin .....	
	..... <i>meridionale</i> Riley	
10.	Ventral plate narrow, in the shape of an inverted Y, with ventral process or keel.....	11
	Ventral plate broader, tooth-shaped, without ventral process .....	
	..... <i>venustum</i> Say	
11.	Ventral keel of ventral plate setose, forming an angle before apex of median portion of ventral plate .....	<i>decorum</i> Walk.
	Ventral keel of ventral plate concave in profile, the angle being at the apex .....	12
12.	Dististyle flattened and sinuous on both margins similar to that in the sub-genus <i>Dyarella</i> .....	<i>rubtzovi</i> Smart
	Dististyle narrower, less sinuous .....	13
13.	Basal arms of ventral plate each with an outward prong; no large parameral hooks; central portion of ventral plate not widened beyond base.....	<i>malyschevi</i> D. R. & V.

- Basal arms of ventral plate without outward prongs; some large parameral hooks; base of central portion of ventral plate very constricted, the distal portion usually wider..... 14
14. VentrO-apical angle of ventral plate scarcely produced beyond dentate portion; parameral hooks a few large ones mingled with much smaller ones.....*arcticum* Mall.
- VentrO-apical angle of ventral plate forming a distinct bare projection beyond dentate portion; parameral hooks gradually lengthening toward center.....*corbis* Twinn
- The male of *nigricoxum* is unknown.

## PUPAE

1. Respiratory filaments 3 (Fig. 2).....*baffinense* Twinn  
Respiratory filaments more than 3..... 2
2. Respiratory filaments 4..... 3  
Respiratory filaments more than 4..... 6
3. Anterior margin of cocoon with a rather long median projection anteriorly, single or split; this may be broken off but usually the base is visible..... 4  
Anterior margin of cocoon nearly or quite straight..... 5
4. Anterior projection of cocoon, if not worn off, split into two divergent arms; petiole of respiratory organ twice as long as wide.....*bicornis* D. R. & V.  
Anterior projection of cocoon single and usually tapering; petiole of respiratory organ not longer than wide.....*latipes* Mg.
5. Dorsal respiratory filament strongly diverging from other three.....*aureum* Fries  
Dorsal respiratory filaments not strongly diverging from other three.....*pugetense* (D. & S.)
6. Respiratory filaments 6..... 7  
Respiratory filaments more than 6..... 8
7. Dorsal pair of respiratory filaments diverging from the two ventral pairs; cocoon with a median projection from anterior margin.....*gouldingi*, n. sp.  
Dorsal pair of respiratory filaments not distinctly diverging from the two ventral pairs; cocoon without a median projection from anterior border.....*tuberosum* (Lund.); *venustum* Say
8. Front of cocoon with a broad collar at distinct angle to surface so that cocoon is boot-shaped..... 9  
Front of cocoon with a narrow collar, little raised above the surface, or the sides not touching antero-ventrally, so the cocoon is wall-pocket shaped..... 11
9. Respiratory filaments 10; cocoon as in figure 4.....*corbis* Twinn  
Respiratory filaments 12 or more..... 10
10. Respiratory filaments 12; cocoon as in figure 3.....*arcticum* Mall.  
Respiratory filaments 16.....*malyschevi* D. R. & V.
11. Respiratory filaments 8..... 12  
Respiratory filaments 10 or more..... 15

- 12. Respiratory filaments arranged 3-1-2-2, the upper three being sessile and divergent, the single filament being mesad, and the two lower pairs on short petioles ..... *decorum* Walk.  
Respiratory filaments either in four distinct pairs or in three groups ..... 13
- 13. Respiratory filaments all paired ..... 14  
Respiratory filaments in three groups ..... *furculatum* Shewell
- 14. Respiratory organ with first pair of filaments on a short petiole, second pair sessile ..... *rubtzevi* Smart  
Dorsal pair of filaments nearly sessile; second pair directed mesad on a longer petiole ..... *rugglesi* N. & M.
- 15. Respiratory filaments 16 ..... *vittatum* Zett.  
Respiratory filaments more than 16 ..... 16
- 16. Respiratory filaments 22-26 ..... *meridionale* Riley  
Respiratory organ a dense tuft of more than 100 filaments ..... *hunteri* Mall.

The pupa of *nigricoxum* has not been found.

**Simulium (Eusimulium) aureum** Fries

Monog. Simul. Sueciae, observationes entomologicae 1:16, 1824 (*Simulia aurea*), ♀, ♂; Puri, Parasitology 17:354-356, 1925, larva, pupa; Twinn, Canad. Jour. Res. D, 14:115, 1936, ♀, ♂, pupa.

Alaskan Distribution.—Alean Highway, 1236; Anchorage; Chitina Road, 4; College; Fairbanks; Katmai; Matanuska; Nabesna Road, 91; Naknek Lake; Northway; Richardson Highway, 23-358; Steese Highway, 38.

**Simulium (Eusimulium) baffinense** Twinn

Fig. 2

Canad. Jour. Res. D, 14:121, 1938, ♀, ♂.

Pupa.—Respiratory filaments (Fig. 2) three, the longest about as long as pupa; dorsal filament weakly swollen basally and strongly divergent upwardly from the other two; second filament bending slightly inwardly and with the base distinctly swollen; third curving slightly downward and outward, slightly less swollen. Dorsum of thorax not rugose. Trichomes 3 on each side, rather long and curved. Tergites 2-4 each with 4 retrorse hooklets on each side, those on 2 very fine; tergites 5-8 each with an irregular row of hooklets near anterior margin; a pair of very short terminal hooks; sternites 4-7 each with 4 hooklets on each side, those on 4 and 5 placed close together on each side, and those on 4 very weak; those on 6 and 7 more evenly placed across the segment.

Alaskan Distribution.—Alean Highway, 1380; Circle Hot Springs Road, 6; Fairbanks; Nabesna Road, 82; Richardson Highway, 103; Willow Road 31.

*Simulium (Eusimulium) bicornis* Dorogostajskij, Rubzov, and Vlasenko  
Leningrad Acad. Sci., URSS, Inst. Zool., Mag. Parasitol. 5:179, 1935,  
♀, ♂, larva, pupa.

Alaskan Distribution.—Alean Highway, 1273-1375; Anchorage; Circle  
Hot Springs, 6; Ekultua Lake; Elliott Highway, 8-62; Fairbanks; Glenn  
Highway, 82-135; Matanuska; Nabesna Road, 31-98; Richardson High-  
way, 8-301; Slana-Tok Road, 14; Steese Highway, 32-158; Willow Road,  
26-33.

This is the first North American record for this species.

***Simulium (Eusimulium) furculatum* Shewell**

Canad. Ent. 8:40, 1952 (*Eusimulium*).

Alaskan Distribution.—Outlet of Summit Lake, Richardson Highway.

***Simulium (Eusimulium) gouldingi*, new species**

Female.—Length about 2.0 mm. Head gray, with fine, recumbent  
yellow hair; width of frons at narrowest 0.082 mm, strongly widened  
above; antenna 11 segmented, about 0.44 mm long, brownish black, the  
scape and pedicel paler. Palpus 0.53 mm. long; ratios of segments 3-5:  
1.5:2:3.6; third segment dark, the sensory organ about one-third length  
of segment; mandibles serrate; maxillae with retrorse teeth. Scutum  
dark, gray-brown, with recumbent hairs, golden yellow medially, nearly  
white marginally; scutellum reddish brown with erect yellow hair;  
postnotum dark with yellowish-gray pruinosity; pleuron reddish brown,  
varied with blackish; mesoepimeral tuft pale yellow. Wing 2.8 mm long;  
radial sector not forked; basal cell rarely completely closed distally;  
hairs on base of costa dorsally, stem vein, and vein R black; base of  
costa ventrally with pale hairs; subcosta with abundant hairs ventrally.  
Halteres pale yellow: Legs yellowish brown, the coxae, apices of femora  
and tibiae, and the tarsi darker; hairs of most of legs pale yellowish;  
leg ratios: I. 4:3:8:9:6:2.8:1.8:1:1.2; II. 3:3.4:8.5:8.5:4.8:2:1:1:1;  
III. 5:3:10.6:10.3:8.5:2:1:1:1:1.1; hind basitarsus about 6.5 times as  
long as wide, with nearly parallel sides; calcipala distinct, reaching to  
the deep pedisulcus; claw with a stout basal projection, at least half  
length of claw. Abdomen brown, clothed with yellow hair; tergites  
rather small; sternites not developed; stem of genital fork 0.21 mm  
long, each arm irregularly widened, weakly sclerotized; anterior gona-  
pophyses short, blunt, pale; paraprocts short, not produced ventrally;  
cerci short, subquadrate, about twice as broad as long.

Male.—Holoptic, the large facets of eye extending down to antenna;  
rest of head nearly black, with dark brown hair; antennae entirely  
dark; palpus dark, about 0.37 mm long; sensory organ of third segment  
very small. Scutum velvety black, with recumbent golden hair; scutellum  
reddish brown with erect orange-brown hair; postnotum dark reddish  
brown, with whitish pollinose reflections; pleuron mostly reddish black;  
mesepimeral tuft nearly black. Wing 2.25-2.6 mm long; hairs all black.  
Halteres brownish, the knobs paler. Legs blackish-brown, the fore coxae,

femora, and tibiae, yellowish, with yellow hair; hairs elsewhere mostly dark; leg ratios: I. 4:2.6:8:8.5:5.5:2.9:2:1:1; II. 4:3:8:7.5:4.2:2:1:1:1; III. 4.5:2.7:10.5:9.5:7.6:1.8:1:1:1; hind tibia slightly swollen, about 4.75 as long as greatest width; hind basitarsus about 5 times as long as greatest width; calcipala and pedisulcus as in female. Abdomen velvety brownish black, with dark hair, the tergites broad, the sternites small and weakly sclerotized; basistyle subquadrate; dististyle about as long as basistyle, the end with a depressed shiny area, the inner angle of which bears a small tooth; ventral plate broad, rounded distally, the arms short, slightly expanded distally, and without lateral projections.

Pupa.—Length 2.0-3.0 mm. Respiratory organ about two-thirds length of pupa, of six filaments arising from a short petiole; dorsal pair of filaments diverging strongly upward from the other two pairs, the petiole about three times as long as broad; petiole of median pair slightly shorter and directed somewhat laterad; petiole of third pair directed somewhat mediad and with the petiole about as in first pair. Trichomes 3 or 4 on each side, slender, rather long; tergites 3 and 4 each with 4 retrorse teeth on each side; 7 and 8 with an irregular row of teeth near anterior margin, few and scattered on 7; terminal hooks small, blunt; sternite 5 with a pair of slender bifid hooks on each side; 6 and 7 each with a single bifid hook on each side. Cocoon wall-pocket shaped, well formed but rather loosely woven, with a tapering anterior median projection.

Holotype: Female, reared, Route 115, 14.5 miles west of Wilkes Barre, Pa. June 5, 1948 (Stone). Paratypes.—ALASKA: College, June 5-6, 1948, 3 pupae; NEW YORK: Wheeler Creek, Inlet, Hamilton Co., June 11, 1950, ♂, June 16-18, 1949, 2 ♂♂, July 6, 1950, ♀, July 11, 1949, ♀; High Rock Pond Outlet, Inlet, Hamilton Co., June 11, 1949, ♂ (G. R. De Foliart). PENNSYLVANIA: Kendall Creek, Luzerne Co., June 4, 1948, 2 ♂♂; Buck Township, Luzerne Co., June 4, 1948, pupa (Stone & Goulding); north of Red Rock, Sullivan Co., June 5, 1948, 2 ♂♂, 2 pupae (Stone). All adults reared. (U. S. Nat. Mus. No. 61192.)

No characters have been found in the adults to separate this species from *latipes* or *pugetense*, but the pupa is quite different from either. I name the species in honor of Mr. R. L. Goulding, who showed me the first place that this species was collected in Pennsylvania.

#### *Simulium (Eusimulium) latipes* (Meigen)

Klass. Besch. Eur. Zweifl. Ins. —:96, 1804 (*Atractocera*); Friederichs, Zeitsch. Angew. Ent. 8:52, 59, 66, 1921, ♀. ♂, larva, pupa.

Alaskan Distribution.—Alean Highway, 1259; Anchorage; College; Circle Hot Springs, 6; Elliott Highway, 13; Fairbanks; Nabesna Road, 31-98; Richardson Highway, 23-240; Slana-Tok Road, 42; Willow Road, 31-51.

**Simulium (Eusimulium) pugetense** (Dyar & Shannon)

Proc. U. S. Nat. Mus. 69(10):23, 1927 (*Eusimulium*), ♂.

Synonym.—*Simulium (Eusimulium) quebecense* Twinn, Canad. Jour. Res., D, 14:117, 1936, ♀, ♂, pupa (New synonymy).

Alaskan Distribution.—Alean Highway; Anchorage; Eklutna; Glenn Highway, 17-24; Nabesna Road, 91-98; Richardson Highway, 8-240; Slana-Tok Road, 21-38; Steese Highway, 16-103; Whittier; Willow Road, 26.

This may be *Simulium costatum* Fried., as recognized by Rubzov. I am very doubtful that it is the true *costatum*, however, so have not used the name.

**Simulium (Neosimulium) vittatum** Zetterstedt

Insecta Lapponica Descripta, p. 803, 1838, ♀; Twinn, Canad. Jour. Res. D, 14:132, 1936, ♀, ♂, pupa.

Alaskan Distribution.—Adak I.; Amehitka I.; Anchorage; Chitina Road, 4-5; Glenn Highway, 16-153; Katmai; Kodiak I.; Matanuska; Nabesna Road, 91-98; Naknek; Northway; Paxson; Popoff I.; Richardson Highway, 25-245; Seward; Willow Road, 5-41.

**Simulium (Simulium) arcticum** Malloch

Fig. 3

U. S. Dept. Agr., Bur. Ent., Tech. Ser. No. 26:37, 1914, ♀; Cameron, Dom. Canad., Dept. Agr. Bull. 5:4-13, 1922 (*simile*), ♀, ♂, larva, pupa.

Alaskan Distribution.—Anaktuvak Pass; Anchorage; Camp 327, Alaskan Engineering Commission; Glenn Highway, 85-174; Healy; Matanuska; Nabesna Road, 36-91; Nenana; Richardson Highway, 81-230; Slana-Tok Road, 39; Steese Highway, 40; Umiat; Willow Road, 5-50.

The excellent description of this species by Cameron was published under the name of *simile*, but this was, I believe, a misdetermination. Cameron's description agrees very well with the species that I have compared with the type of *arcticum* but not with the type of *similis*.

**Simulium (Simulium) corbis** Twinn

Fig. 4

Canadian Jour. Res., D, 14:147, 1936, ♀, ♂, pupa.

Synonym.—*Simulium* (s. str.) *relictum* Rubzov, Faune de l'URSS, Ins. Dipt. 6(6):425, 516, 1940 (new synonymy).

Alaskan Distribution.—Anchorage; Elliott Highway 46; Glenn Highway, 16-148; Goose Bay, Knik Arm; Nabesna Road, 36-96; Richardson Highway, 131; Tok.

**Simulium (Simulium) decorum** Walker

List Diptera British Museum 1:112, 1848, ♀.



Synonyms.—*Simulium nölteri* Friedrichs, Berl. Tierarztl. Wochenschr. 36:567, Nov. 1920 (new synonymy).

*Simulium subornatum* Edwards, Bull. Ent. Res. 11:227, Dec. 1920, ♀, ♂, pupa (new synonymy).

*Simulium tenuimanus* Enderlein, Sitz. Ber. Ges. nat. Freunde Berlin 1920:222, 1921 (new synonymy).

*Simulium decorum katmai* Dyar & Shannon, U. S. Nat. Mus. Proc. 69(10):31, 1927 (new synonymy).

*Simulium ottawaense* Twinn, Canad. Jour. Res. D, 14:146, 1936, ♀, ♂, pupa (new synonymy).

Alaskan Distribution.—Anchorage; Big Timber; Chitina Road, 4; Cirele; College; Fort Yukon; Gakona; Glenn Highway, 16-24; Golovin; Katmai; Ketchikan; Kotzebue; Kulak Bay; Matanuska, Mentasta; Nabesna Road, 52-97; Nenana; Pigot Bay, Prince William Sound; Richardson Highway, 87-358; Seward; Skagway; Slana; Steese Highway, 61-156; Umiat; Valdez; Willow Road, 5.

#### **Simulium (Simulium) hunteri** Malloch

U. S. Dept. Agr., Bur. Ent. Tech. Ser. No. 26:59, 1914, ♀.

Male.—Holoptic, the large facets of eye extending down to antennae; rest of head nearly black, with dark brown hair; antenna dark, the scape and pedicel paler; palpus dark. Scutum velvety black, with fine golden hairs, the anterior margin behind humeri, the sides, and the prescutellar area gray pollinose; humeri yellow brown; scutellum dark brown; postnotum black, with grayish reflections; pleuron mostly dark; mesepimeral tuft dark brown. Wings 3.25 mm long, the hairs at base of costa and on stem vein dark brown. Halteres pale yellow. Legs yellow brown to dark brown, the fore coxae and bases of tibiae and metatarsi palest; fore tibia with a large area of silvery white pollen and pile; leg ratios: I. 5:3.6:11:13:8.5:4:3:1.2:2; II. 5:3.5:11.5:12:6:2.5:2:1.2:2; III. 5:2.5:16:15:11:2.5:2:1.3:2; hind tibia expanding to distal fourth, and then narrowing, about four times as long as greatest width; hind basitarsus broad and flat, 3.6 times as long as wide; calcipala a broad triangle; pedisceleus deep. Abdomen velvety brownish black, with dark hair; sternites sclerotized but rather small; basistyles slightly broader than long; dististyles rather long and narrow, about four times as long as wide, with a broad, flattened, sclerotized lobe at base internally; apex with a single slender tooth; ventral plate triangular, the median portion longer than wide, with a narrow hyaline apex; basal arms about two-thirds length of median portion, with no lateral prongs; parameral hooks largest medially.

Pupa.—Length 3.8-4.25 mm. Respiratory organ a dense mass of very fine filaments extending laterally and antero-posteriorly, the mass about equal in size to the cephalothorax exclusive of appendages. Dorsum of thorax densely covered with erect hairs or trichomes. Tergites 3 and 4 each with 4 hooks on each side; 6-9 each with an irregular row of hooks anteriorly; terminal hooks short; sternites 3, 5 and 6 each with one hook

on each side, 4 with two hooks on each side. Cocoon closely woven, wall-pocket shaped, floored on posterior half, the anterior rim sloping backward from base.

Alaskan Distribution.—Chitina Road, 4; Eklutna Lake; Haines; Richardson Highway, 8-297; Seward; Valdez.

**Simulium (Simulium) malyschevi** Dorogostajakij, Rubzov,  
and Vlasenko

Leningrad Acad. Sci., URSS, Inst. Zool., Mag. Parasitol. 5:142, 1935;  
♀, ♂, larva, pupa.

Synonym.—*Simulium* sp. 4, Malloch, Report Canadian Arctic Exped. 1913-18, 3 Insects, C Diptera, p. 43, 1919, pupa.

Alaskan Distribution.—Elliott Highway, 38; Richardson Highway, 325; Steese Highway, 34-148; Willow Road, 50.

The respiratory filaments of the pupa, and the somewhat swollen, divergent anterior gonapophyses of the female make the determination of these Alaskan specimens as this Siberian species rather certain. Malloch first described the pupa of this species in the far north but designated it by number only.

**Simulium (Simulium) meridionale** Riley

Rept. U. S. Dept. Agr. for 1886, p. 513, 1886, ♀.

Synonyms.—*Simulium occidentale* Townsend, Psyche 6:107, 1891; Dyar & Shannon, Proc. U. S. Nat. Mus. 69(10):32, 1927, ♀, ♂.

*Simulium tamaulipense* Townsend, Journ. N. Y. Ent. Soc. 5:171, 1897.

*Simulium forbesi* Malloch, U. S. Dept. Agr., Bur. Ent. Tech. Ser. 26:50, 1914, ♀, ♂, pupa.

Alaskan Distribution.—Galena, VII.30.44 (Stage), 19 females collected on plane after leaving for Fairbanks; Golovin, 23.VII.29; Lower Yukon River, 10.VII.51 (Berg). Dyar & Shannon record *occidentale* from Skagway, but I have not been able to find a specimen to verify this.

**Simulium (Simulium) nigricoxum**, new name

Synonym.—*Simulium similis* Malloch, Report Canadian Arctic Exped. 1913-18, 3 Insects, C Diptera, p. 42, 1919, ♀. (Preoccupied by *Simulium simile* Figueroa, 1917.)

Alaskan Distribution.—Anaktuvak Pass; Chitina Road, 13; Nabesna Road, 70-93; Steese Highway 96-108; Umiat.

This species has been synonymized with *arcticum* Malloch, but an examination of the type shows the fore coxae to be dark, whereas in *arcticum* these are yellow. Only the female is known, but many specimens were collected on the wing in Alaska. The tooth of the tarsal claw is often difficult to see, but the species can be distinguished from *venustum* and related species by the faint grayish bloom on the frons and terminal abdominal segments, from *decorum* by its considerably smaller size, and from all Alaskan species of the subgenus by the dark fore coxae.

Smart (Proc. Roy. Ent. Soc. London, B, 13:133, 1944) proposed the name *figueroa* for *Simulium simile* Figueroa, 1917, believing it to be preoccupied by *S. similis* Malloch. The reverse is the case, however, Malloch's species not being described until 1919, so *figueroa* Smart falls into synonymy, and a new name is here proposed for Malloch's species.

***Simulium (Simulium) rubtzovi* Smart**

Entomologist 79:22, 1946.

Synonym.—*Simulium similis* Rubzov, Leningrad Acad. Sci., URSS, Inst. Zool., Mag. Parasit. 7:196, 1940, ♀, ♂, larva, pupa. (Preocc. by *S. simile* Figueroa, 1917, and *S. similis* Malloch, 1919).

Alaskan Distribution.—Fairbanks; Richardson Highway, 163.

This is the first report of this Siberian species in North America. Females, males, and pupae were collected.

***Simulium (Simulium) rugglesi* Nicholson and Mickel**

Univ. Minnesota, Agr. Expt. Sta., Tech. Bull. 192:60, 1950, ♀.

Male.—Holoptic, the eyes large and the large facets extending down to antennae; rest of head blackish with dark hair; antenna dark brown with pale pile, the scape and pedicel yellowish; antenna slightly enlarged to apical third and then tapering to apex; palpus dark; sensory organ small. Scutum velvety black, with coppery brown, recumbent hair; oblique patches behind the humeri, the sides, and the prescutellar area gray, subshining; scutellum dark reddish brown, with erect black hair; postnotum black; pleuron mostly dark; mesepimeral tuft dark brown. Wing about 2.0 mm long, the hairs at base of costa and on stem vein dark brown. Halteres pale yellow. Legs dark brown, the fore coxae, most of fore tibia, narrow bases of mid and hind tibiae, base of mid basitarsus, and basal two thirds of hind basitarsus yellowish; leg ratios: I. 5:3:9:10:7:3:2:1:1; II. 4:3:9:8.5:5:1.2:1:1; III. 5:2:12:10:8:2:1:1:1; hind tibia expanding to distal third and then narrowing, about 3.3 times as long as greatest width; hind basitarsus flattened, about 4 times as long as wide; calcipala well developed; pedisuleus deep. Abdomen brownish black, with dark hair; tergites large; sternites narrow transverse bands; basistyles subquadrate; dististyles somewhat flattened, their inner margins concave; at base internally a small rounded lobe bearing fine hairs; apex with a single rather large spine; ventral plate moderately broad, truncate distally; basal arms with no lateral prongs; parameral hooks rather small.

Pupa.—Length about 3 mm. Respiratory organ about 1.5 mm long of 8 filaments in pairs; dorsal pair nearly sessile; second pair internal on a larger petiole; two lower pairs on a short petiole, and each with a much longer petiole. Tergites 3-4 each with four large hooks on each side; 6-9 each with an anterior row of smaller hooks; terminal hooks very short. Cocoon wall-pocket shaped, the sides produced anteriorly, the anterior margin in middle slightly convex.

Alaskan Distribution.—Steese Highway, 139.

This species is included here on the basis of a single female collected at the above locality Sept. 4, 1948. The male and pupa are described for the first time from a series of specimens associated with females collected by J. W. and F. A. Leonard in the Pere Marquette River, Lake Co., Michigan, June 30, 1947.

***Simulium (Simulium) tuberosum* (Lundstroem)**

Acta Fauna Flora Fenn. 34(12):14, 1911, ♂, (*Melusina*).

Synonyms.—*Simulium perissum* Dyar & Shannon, Proc. U. S. Nat. Mus. 69(10):43, 1927, ♀, ♂; Twinn, Canad. Jour. Res. D, 14:138, 1936, ♀, ♂, pupa.

*Simulium vandalicum* Dyar & Shannon, Proc. U. S. Nat. Mus. 69(10):44, ♂.

*Simulium turmale* Twinn, Canad. Ent. 70:51, 1938, ♂.

*Simulium twinni* Stains & Knowlton, Ann. Ent. Soc. Amer. 33:77, 1940, ♂.

Alaskan Distribution.—Alean Highway, 1248-1380; Anchorage; College; Elliott Highway, 13-76; Fairbanks; Glenn Highway, 16-186; Kotzebue; Nabesna Road, 36-96; Richardson Highway, 24-310; Slana-Tok Road, 37-48; Steese Highway, 32-148; Willow Road, 5-50.

***Simulium (Simulium) venustum* Say**

Journ. Acad. Sci. Philadelphia 3:28, 1823, ♀, ♂; Twinn, Canad. Jour. Res. D, 14:136, ♀, ♂, pupa.

Alaskan Distribution.—Alean Highway, 1225-1375; Anchorage; Camp 227, Alaskan Engineering Commission; Canadian border, lat. 69° 10'; Dead Horse; Elliott Highway, 13-45; Fairbanks; Glenn Highway, 16-153; Healy; Hurricane; Ketchikan; Kotzebue; Matanuska; Metlakhtla; Mount McKinley National Park; Nabesna Road, 80-110; Northway; Old Crow River; Paxons Lake; Popoff Island; Rampart House; Richardson Highway, 17-310; Seward; Slana; Slana-Tok Road, 1-42; Steese Highway, 10-149; Tok; Willow Road, 2-5.

SUMMARY

The Alaskan distribution of 36 species of blackflies is given and 5 of these are described as new. Keys for the females, males, and pupae, as far as these are known, are given. In addition to the new species the males of five species and pupae of six species are described and a new name is proposed. Some new synonymy is given and it is shown that 11 of the species are Holarctic in distribution.